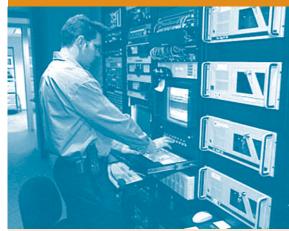# CALIFORNIA OCCUPATIONAL GUIDES

NETWORK AND COMPUTER SYSTEMS ADMINISTRATORS

WHAT DOES A NETWORK AND COMPUTER SYSTEMS ADMINISTRATOR DO?

NETWORK AND COMPUTER SYSTEMS ADMINISTRATORS install, configure, and support an organization's local area network (LAN), wide area network (WAN), and Internet system, or a segment of a network system. They maintain network hardware and software. Administrators monitor the network to ensure its availability to all system users and perform necessary maintenance to support its availability. They plan, coordinate, and implement security measures for information systems that regulate access to computer data files and prevent persons from modifying, destroying, or disclosing information.

Network And Computer Systems Administrators are sometimes called Computer Network Technicians or Computer Systems Engineers. They perform the following tasks:

- Gather data to identify system and network requirements, and interpret and evaluate the requirements.
- Review network architecture, topology, interdependencies, constraints and recommend selection of related hardware and software.
- Prepare overall design and integration plan for new processes, protocols, and equipment, and participate in design reviews.
- Implement and maintain computer network system architecture, including network hardware.
- Provide ongoing network administration, maintenance, diagnostic, and support services.
- Maintain software and peripheral equipment (such as printers) that are connected to the network.
- Oversee technical support and help desk personnel.
- Provide user log-on access to computer files, printers, applications, and databases according to job function.
- Develop plans to safeguard computer files against accidental or unauthorized modification, destruction, or disclosure and to meet emergency data processing needs.
- Review security logs to make sure only those with legal access to specific files are using them.
- Back up computer files daily to ensure the safety, stability, and reliability of stored data and restore data if network crashes.
- Plan installation of network software and hardware.
- Install and maintain extranets (accessible to the public), intranets (accessible only to company employees), operating systems, and database management systems.
- Plan and document system configuration and implement new system configuration.

- Perform workstation configuration and software loading.
- Support, track, and document implementation of upgrades, moves, and changes.
- Develop, schedule, and perform system and network testing and document, interpret, and report results.
- Monitor and report component, security, and connectivity problems.
- Apply, develop, and document changes to upgrades, maintenance, and processes.
- Coordinate and monitor machine rooms for power and temperature stability.

Computer Security Specialists

In some organizations, Computer Security Specialists are hired to plan, coordinate, and implement the security measures for information systems. Smaller firms assign these tasks to the Network or Computer Systems Administrators. The Computer Security Specialist's goal is to regulate access to computer data files and prevent unauthorized individuals from altering, releasing, or destroying information. They generally perform the following tasks:

- Develop plans to safeguard computer files against accidental or unauthorized modification, destruction, or disclosure and meet emergency data processing needs.
- Coordinate implementation of computer system plan with establishment personnel and outside vendors.
- Test data processing system to ensure functioning of data processing activities and security measures.
- Modify computer security files to incorporate new software, correct errors, or change individual access status.
- Confer with personnel to discuss issues such as computer data access needs, security violations, policies, and programming changes.
- Monitor use of data files and regulate access to safeguard information in computer files.
- Write reports to document computer security and emergency measures, policies, procedures, and test results.

WHAT SKILLS ARE IMPORTANT?

Important skills, knowledge, and abilities for Network and Computer Systems Administrators include the following:

- Customer and Personal Service – Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.
- Critical Thinking – Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
- Programming – Writing computer programs for various purposes.
- Writing – Communicating effectively in writing as appropriate for the needs of the audience.
- Mathematics – Using basic mathematics to solve problems.
- Technology Design – Generating or adapting equipment and technology to serve user needs.
- Active Listening – Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
- Operations Analysis – Analyzing needs and product requirements to create a design.
- Installation – Installing equipment, machines, wiring, or programs to meet specifications.
- Equipment Selection – Determining the kind of tools and equipment needed to do a job.
- Computers and Electronics – Knowledge of circuit boards, processors, electronic equipment, and computer hardware and software, including applications.
- Public Safety and Security – Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.
- Reading Comprehension – Understanding written sentences and paragraphs in work related documents.

- Troubleshooting – Determining causes of operating errors and deciding what to do about it.
- Deductive Reasoning – The ability to apply general rules to specific problems to produce answers that make sense.
- Oral Expression – The ability to communicate information and ideas in speaking so others will understand.
- Near Vision – The ability to see things at close range (within a few feet of the observer).
- Information Ordering – The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).
- Fluency of Ideas – The ability to come up with a number of ideas about a topic (the number of ideas is important, not their quality, correctness, or creativity).
- Problem Sensitivity – The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

WHAT'S THE WORK ENVIRONMENT?

Most Administrators spend their working hours indoors in environmentally controlled buildings. Communications rooms, where voice and data equipment are kept, can sometimes be cold. Some lifting and moving of hardware is required.

A considerable amount of time is spent typing on computer keyboards, which can lead to hand and wrist problems for those who do not take precautions such as ensuring they have an ergonomic workstation. The importance of being exact or accurate, frequent deadlines, and the severe consequences of errors, can be stressful for some.

Union Membership

Most workers in this classification are not represented by unions. However, those who work in government or hospital settings have the option to join unions, such as the Service Employees International Union.

WHAT'S THE CALIFORNIA JOB OUTLOOK?

The following information is from the occupational projections produced by the Employment Development Department (EDD) Labor Market Information Division (LMID):

Network and Computer Systems Administrators	
Estimated number of workers in 2002:	33,500
Estimated number of workers in 2012:	45,900
Projected Growth 2002-2012:	37%
Est. openings due to separations by 2012:	3,700

These figures do not include self-employment.

This occupation is projected to be among the fastest growing over the 2002-12 period. Statewide, there are a total of 16,100 new and replacement job opportunities expected for this occupation between 2002 and 2012, with an annual number of job opportunities expected at 1,610. These numbers do not include current positions or expected opportunities for self-employed contract workers.

Trends

While nearly two-thirds of California's information technology (IT) professionals work in high technology industries, Systems Administrators are found throughout the California economy. The State of California projects that by 2012 virtually every industry will employ Network and Computer Systems Administrators due to the increasing emphasis on client-server applications, the expansion of Internet and Intranet applications, and the demand for more end-user support.

WHAT DOES THE JOB PAY?

California Earnings

The following information is from the Occupational Employment Statistics Survey of Employers by EDD/LMID:

Network and Computer Systems Administrators 2005 Wages		
Hourly wages range from	$25.13 to	$40.23
Average hourly wage	$33.16	
Average annual wage	$68,992	

These figures do not include self-employment.

Hours

Administrators usually work 40-45 hours a week, and may also be "on call" via pager or telephone for rotating evening or weekend work, if the employer requires computer support over extended hours. Overtime may be necessary when unexpected technical problems arise.

Benefits

Network and Computer Systems Administrators generally receive medical and dental insurance, vacation, sick leave, and retirement plans from their employers.

HOW DO I PREPARE FOR THE JOB?

Education and Training

A bachelor's degree in computer science, computer information systems, business, or a related field is often required for entry into this field. Some employers will accept an associate degree in computer science or certificates plus two or more years on-the-job experience; however, these locations usually tend to be smaller (less than 50 computers), more uniform sites running on a single operating system.

A survey of 9,651 Systems Administrators employed in 2002 by *CertCities*, an online magazine for IT professionals, shows more than 47 percent had attained at least a bachelor's degree.

Twenty-two percent indicated they had attended some college or technical school, with fifteen percent reporting they earned certificates through independent study. Eleven percent reported earning a high school diplomas or less of education.

To locate educational programs for Network and Computer Systems Administrators, go to the California Postsecondary Education Commission's Web site at: www.cpec.ca.gov/collegeguide/collegeguide.asp.

Licensing and Certification

There are hundreds of certifications available to Network and Computer Systems Administrators, offered through community colleges or adult education training programs, a variety of vendors, and product makers. According to a Fall 2004 survey conducted by *CertCities*, an on-line magazine for certified IT professionals, the top most desirable certifications for 2005 were expected to be the following:

- Cisco Certified Internetwork Expert (CCIE)
- Microsoft Certified Systems Engineer: Security (MCSE: Security)
- Red Hat Certified Engineer (RHCE)
- Cisco Certified Security Professional (CCSP)
- Cisco Certified Network Professional (CCNP)
- Linux Professional Institute Certification Level 2 (LPIC-2)
- Novell Certified Linux Professional (Novell CLP)
- MySQL Core Certification
- Security+ (vendor: Vendor: Computing Technology Industry Assn)
- Project Management Professional (PMP)

Becky Nagel, editor of *CertCities*, recommends less-expensive self-study tutorials or community college classes for those who don't have an employer to cover costs of private courses. She cautions "when starting out, not to get too many (certificates) — that can actually hurt candidates because they'll come off as 'paper'. One or possibly two certs matching the candidate's actual experience level (entry, admin, etc.) is much more effective. But even then it still guarantees nothing — it's what you know that counts."

Given the sensitive nature of their job, candidates for Computer Security Specialist jobs are required by prospective employers to have background investigations conducted before they can be hired.

There is currently no license required by the State of California for Network and Computer Systems Administrators.

Continuing Education

Many continuing education programs exist through employers, hardware and software vendors, colleges and universities, and private training institutions. Professional development seminars and conferences offered by computing services firms also enhance skills and advancement opportunities, as well as self-teaching through available written materials.

HOW DO I FIND THE JOB?

Contacting employers directly remains one of the most effective job search methods. Network and Computer Systems Administrator jobs exist in every industry, and jobseekers are advised to contact large employers. Internships and association memberships offer both educational and networking opportunities, as does taking individual certification classes in training facilities.

Search these **yellow page** headings for listings:

- Computer Networks
- Data Networks
- Computer Service and Repair
- Computer System Designers and Consultants

The following Internet resources can be helpful to the job search process:

America's Career InfoNet
www.acinet.org

America's Job Bank
www.ajb.dni.us

CalJOBS℠
www.caljobs.ca.gov

Job Search and Resume Writing
www.worksmart.ca.gov/success_tips_menu.html

Local Job Service Offices
www.edd.ca.gov/jsrep/jsloc.htm

Occupational Information Network (O*NET) Online
http://online.onetcenter.org

One-Stop Career Centers List
www.edd.ca.gov/ONE-STOP/pic.htm

For statewide and local projections, wages, employers by county, and other occupational information go to www.labormarketinfo.edd.ca.gov and select *Find an Occupation Profile*.

WHERE CAN THE JOB LEAD?

Network and Computer Systems Administrators who gain extensive work experience and who regularly update their skills with training can promote to senior positions such as Data Processing Manager, which command higher wages and a broader level of decision making.

OTHER SOURCES OF INFORMATION

Systems Administrators Guild (SAGE)
2560 Ninth Street, Suite 215
Berkeley, CA 94710
(510) 528-8649
www.sage.org

RELATED OCCUPATIONAL GUIDES

Computer Programmers	No.	81
Computer Systems Engineers	No.	488
Computer Systems Analysts	No.	541
Computer Support Specialists	No.	589

OCCUPATIONAL CODE REFERENCES

SOC *(Standard Occupational Classification)*
Network and Computer Systems
  Administrators   15-1071

O*NET *(Occupational Information Network)*
Network and Computer Systems
  Administrators   15-1071.00
Computer Security Specialists   15-1071.01

OES *(Occupational Employment Statistics)*
Computer Support Specialists   25104